

## CLAIMS

What is claimed is:

1           1.     A method comprising:  
2     determining a criticality of a next-in-line  $\mu$ OP of a first input stream; and  
3     if the next-in-line  $\mu$ OP of the first input stream is not critical, discarding the next-in-line  
4          $\mu$ OP of the first input stream and placing a next-in-line  $\mu$ OP of a second input  
5         stream into an output stream.

1           2.     The method of claim 1, further comprising:  
2     if the next-in-line  $\mu$ OP of the first input stream is critical, placing the next-in-line  $\mu$ OP of  
3         the first input stream into the output stream and holding the next-in-line  $\mu$ OP of  
4         the second input stream.

1           3.     The method of claim 2, wherein holding the next-in-line  $\mu$ OP of the  
2     second input stream comprises holding the next-in-line  $\mu$ OP of the second input stream  
3     until a next clock cycle.

1           4.     The method of claim 1, further comprising placing the discarded next-in-  
2     line  $\mu$ OP of the first input stream into a replay loop.

5. A method comprising:

determining a criticality of a next-in-line  $\mu$ OP of a front-door stream; and  
if the next-in-line front-door  $\mu$ OP is not critical, whacking the next-in-line front-door  
 $\mu$ OP and placing a next-in-line  $\mu$ OP of a side-door stream into an execution  
stream.

6. The method of claim 5, further comprising:

if the next-in-line front-door  $\mu$ OP is critical, placing the next-in-line front-door  $\mu$ OP into  
the execution stream and holding the next-in-line side-door  $\mu$ OP.

7. The method of claim 6, wherein holding the next-in-line side-door  $\mu$ OP

comprises holding the next-in-line side-door  $\mu$ OP until a next clock cycle.

8. A method comprising:

examining whether there is contention for an entry slot into an execution stream;  
examining a criticality of a next-in-line  $\mu$ OP of a front-door stream if there is contention  
at the entry slot; and  
if the next-in-line front-door  $\mu$ OP is not critical, discarding the next-in-line front-door  
 $\mu$ OP and placing a next-in-line  $\mu$ OP of a side-door stream into the entry slot.

1           9.     The method of claim 8, further comprising:

2     if the next-in-line front-door  $\mu$ OP is critical, placing the next-in-line front-door  $\mu$ OP into  
3           the entry slot and holding the next-in-line side-door  $\mu$ OP.

1           10.    The method of claim 9, wherein holding the next-in-line side-door  $\mu$ OP

2     comprises holding the next-in-line side-door  $\mu$ OP until a next clock cycle.

1           11.    The method of claim 8, further comprising placing the discarded next-in-  
2     line front-door  $\mu$ OP into a replay loop.

1           12.    The method of claim 8, further comprising placing a pending  $\mu$ OP into the  
2     entry slot if there is no contention for the entry slot, the pending  $\mu$ OP comprising a next-  
3     in-line  $\mu$ OP of one of the front-door stream and the side-door stream.

1           13.    A method comprising:

2     accessing a next-in-line  $\mu$ OP of an input stream;  
3     applying a metric to the next-in-line  $\mu$ OP; and  
4     if the next-in-line  $\mu$ OP satisfies the metric, identifying the next-in-line  $\mu$ OP as critical.

1           14.    The method of claim 13, further comprising identifying the next-in-line

2      $\mu$ OP as not critical if the next-in-line  $\mu$ OP does not satisfy the metric.

1           15.     The method of claim 13, wherein the metric comprises comparing an age  
2     of the next-in-line  $\mu$ OP with a predefined threshold age.

1           16.     The method of claim 13, wherein the metric comprises determining  
2     whether a thread associated with the next-in-line  $\mu$ OP has been given priority.

1           17.     The method of claim 14, further comprising issuing a select signal,  
2     wherein the select signal indicates:  
3     if the next-in-line  $\mu$ OP is critical, that the next-in-line  $\mu$ OP is selected for output; and  
4     if the next-in-line  $\mu$ OP is not critical, that a next-in-line  $\mu$ OP of another input stream is  
5     selected for output.

1           18.     A method comprising:  
2     accessing a next-in-line  $\mu$ OP of a front-door stream;  
3     comparing an age of the next-in-line front-door  $\mu$ OP with a predefined threshold age; and  
4     if the age of the next-in-line front-door  $\mu$ OP exceeds the threshold age, identifying the  
5     next-in-line front-door  $\mu$ OP as critical.

1           19.     The method of claim 18, further comprising identifying the next-in-line  
2     front-door  $\mu$ OP as not critical if the age of the next-in-line front-door  $\mu$ OP is less than the  
3     threshold age.

20. The method of claim 18, wherein the threshold age corresponds to an oldest  $\mu$ OP .

21. The method of claim 18, wherein the next-in-line front-door  $\mu$ OP is associated with a thread, the method further comprising:  
determining whether the thread has been given priority; and  
if the thread does not have priority, identifying the next-in-line front-door  $\mu$ OP as not critical.

22. The method of claim 19, further comprising issuing a select signal, wherein the select signal indicates:  
if the next-in-line front-door  $\mu$ OP is critical, that the next-in-line front-door  $\mu$ OP is selected for output; and  
if the next-in-line front-door  $\mu$ OP is not critical, that a next-in-line  $\mu$ OP of a side-door stream is selected for output.

23. A method comprising:  
accessing a next-in-line  $\mu$ OP of a front-door stream, the next-in-line front-door  $\mu$ OP associated with a thread;  
determining whether the thread has been given priority; and  
if the thread has priority, identifying the next-in-line front-door  $\mu$ OP as critical.

24. The method of claim 23, further comprising identifying the next-in-line front-door  $\mu$ OP as not critical if the thread does not have priority.

25. The method of claim 23, further comprising:  
comparing an age of the next-in-line front-door  $\mu$ OP with a predefined threshold age; and  
if the age of the next-in-line front-door  $\mu$ OP is less than the threshold age, identifying the next-in-line front-door  $\mu$ OP as not critical.

26. The method of claim 24, further comprising issuing a select signal, wherein the select signal indicates:  
if the next-in-line front-door  $\mu$ OP is critical, that the next-in-line front-door  $\mu$ OP is selected for output; and  
if the next-in-line front-door  $\mu$ OP is not critical, that a next-in-line  $\mu$ OP of a side-door stream is selected for output.

1           27.    A device comprising  
2    a selector having a first input, a second input, and an output;  
3    first circuitry coupled with the first input, the first circuitry to provide a first input stream  
4           to the selector; and  
5    second circuitry coupled with the second input, the second circuitry to provide a second  
6           input stream to the selector, the second circuitry to  
7                   determine a criticality of a next-in-line  $\mu$ OP of the first input stream, and  
8                   if the next-in-line  $\mu$ OP of the first input stream is not critical, provide a  
9                           select signal to the selector indicating that the next-in-line  $\mu$ OP of  
10                           the second input stream is selected for the output of the selector.

1           28.    The device of claim 27, the second circuitry, if the next-in-line  $\mu$ OP of the  
2    first input stream is critical, to provide a select signal to the selector indicating that the  
3    next-in-line  $\mu$ OP of the first input stream is selected for the output of the selector and  
4    hold the next-in-line  $\mu$ OP of the second input stream.

1           29.    The device of claim 28, the second circuitry to hold the next-in-line  $\mu$ OP  
2    of the second input stream until a next clock cycle.

1           30.    The device of claim 27, further comprising execution circuitry coupled  
2    with the output of the multiplexer.

1           31.    A device comprising

2    a multiplexer having a front-door input, a side-door input, and an output;

3    a scheduler coupled with the first input, the scheduler to provide a front-door stream to  
4       the multiplexer; and

5    a page miss handler coupled with the side-door input, the page miss handler to provide a  
6       side-door stream to the multiplexer, the page miss handler to

7           determine a criticality of a next-in-line  $\mu$ OP of the front-door stream, and

8           if the next-in-line front-door  $\mu$ OP is not critical, whack the next-in-line

9               front-door  $\mu$ OP and place a next-in-line  $\mu$ OP of the side-door

10           stream into the output of the multiplexer.

1           32.    The device of claim 31, the page miss handler to place the next-in-line

2    front-door  $\mu$ OP into the output of the multiplexer and hold the next-in-line side-door  $\mu$ OP

3    if the next-in-line front-door  $\mu$ OP is critical.

1           33.    The device of claim 32, the page miss handler to hold the next-in-line

2    side-door  $\mu$ OP until a next clock cycle.

1           34.    The device of claim 31, further comprising execution circuitry coupled

2    with the output of the multiplexer.



1           35.     The device of claim 31, the page miss handler to provide a select signal to  
2 another input of the multiplexer.

1           36.     The device of claim 31, the page miss handler coupled with a whacking  
2 element, the whacking element to determine the criticality of the next-in-line front-door  
3  $\mu$ OP.

1           37.     A device comprising:  
2 a selector to receive an input stream; and  
3 a whacking element coupled with the selector, the whacking element to  
4 access a next-in-line  $\mu$ OP of the input stream,  
5 apply a metric to the next-in-line  $\mu$ OP, and  
6 if the next-in-line  $\mu$ OP satisfies the metric, identify the next-in-line  $\mu$ OP  
7 as critical.

1           38.     The device of claim 37, the whacking element to identify the next-in-line  
2  $\mu$ OP as not critical if the next-in-line  $\mu$ OP does not satisfy the metric.

1           39.     The device of claim 37, the whacking element, when applying the metric,  
2 to compare an age of the next-in-line  $\mu$ OP with a predefined threshold age.

1           40.     The device of claim 37, the whacking element, when applying the metric,  
2     to determine whether a thread associated with the next-in-line  $\mu$ OP has been given  
3     priority.

1           41.     The device of claim 38, the whacking element to provide a select signal to  
2     the selector, wherein the select signal indicates:  
3     if the next-in-line  $\mu$ OP is critical, that the next-in-line  $\mu$ OP is selected for output; and  
4     if the next-in-line  $\mu$ OP is not critical, that a next-in-line  $\mu$ OP of another input stream is  
5     selected for output.

1           42.     A device comprising:  
2     a multiplexer having a first input, a second input, and an output, the multiplexer to  
3     receive a front-door stream at the first input;  
4     a page miss handler coupled with the second input of the multiplexer, the page miss  
5     handler to provide a side-door stream to the multiplexer; and  
6     a whacking element coupled with the page miss handler, the whacking unit to  
7     access a next-in-line  $\mu$ OP of the front-door stream,  
8     compare an age of the next-in-line front-door  $\mu$ OP with a predefined  
9     threshold age, and  
10     if the age of the next-in-line front-door  $\mu$ OP exceeds a threshold age,  
11     identify the next-in-line front-door  $\mu$ OP as critical.

1           43.     The device of claim 42, the whacking element to identify the next-in-line  
2 front-door  $\mu$ OP as not critical if the age of the next-in-line front-door  $\mu$ OP is less than the  
3 threshold age.

1           44.     The device of claim 42, wherein the threshold age corresponds to an oldest  
2  $\mu$ OP.

1           45.     The device of claim 42, wherein the next-in-line front-door  $\mu$ OP is  
2 associated with a thread, the whacking element to:  
3 determine whether the thread has been given priority; and  
4 if the thread does not have priority, identifying the next-in-line front-door  $\mu$ OP as not  
5 critical.

1           46.     The device of claim 43, the whacking element to provide a select signal to  
2 the multiplexer, wherein the select signal indicates:  
3 if the next-in-line front-door  $\mu$ OP is critical, that the next-in-line front-door  $\mu$ OP is  
4 selected for output; and  
5 if the next-in-line front-door  $\mu$ OP is not critical, that a next-in-line  $\mu$ OP of a side-door  
6 stream is selected for output.

1           47.    A device comprising:

2    a multiplexer having a first input, a second input, and an output, the multiplexer to

3           receive a front-door stream at the first input;

4    a page miss handler coupled with the second input of the multiplexer, the page miss

5           handler to provide a side-door stream to the multiplexer; and

6    a whacking element coupled with the page miss handler, the whacking element to

7           access a next-in-line  $\mu$ OP of the front-door stream, the next-in-line front-

8           door  $\mu$ OP associated with a thread,

9           determine whether the thread has been given priority, and

10          if the thread has priority, identify the next-in-line front-door  $\mu$ OP as

11          critical.

1           48.    The device of claim 47, the whacking element to identify the next-in-line

2    front-door  $\mu$ OP as not critical if the thread does not have priority.

1           49.    The device of claim 47, the whacking element to:

2    compare an age of the next-in-line front-door  $\mu$ OP with a predefined threshold age; and

3    if the age of the next-in-line front-door  $\mu$ OP is less than the threshold age, identify the

4    next-in-line front-door  $\mu$ OP as not critical.

1           50.     The method of claim 48, the whacking element to provide a select signal  
2     to the multiplexer, wherein the select signal indicates:  
3     if the next-in-line front-door  $\mu$ OP is critical, that the next-in-line front-door  $\mu$ OP is  
4         selected for output; and  
5     if the next-in-line front-door  $\mu$ OP is not critical, that a next-in-line  $\mu$ OP of a side-door  
6         stream is selected for output.

1           51.     An article of manufacture comprising:  
2     a machine accessible medium providing content that, when accessed by a machine,  
3     causes the machine to  
4         determine a criticality of a next-in-line  $\mu$ OP of a first input stream; and  
5         if the next-in-line  $\mu$ OP of the first input stream is not critical, discard the next-in-  
6             line  $\mu$ OP of the first input stream and place a next-in-line  $\mu$ OP of a second  
7             input stream into an output stream.

1           52.     The article of manufacture of claim 51, wherein the content, when  
2     accessed, further causes the machine to:  
3     if the next-in-line  $\mu$ OP of the first input stream is critical, place the next-in-line  $\mu$ OP of  
4         the first input stream into the output stream and hold the next-in-line  $\mu$ OP of the  
5         second input stream.

53. The article of manufacture of claim 52, wherein the content, when accessed, further causes the machine to hold the next-in-line  $\mu$ OP of the second input stream until a next clock cycle.

54. The article of manufacture of claim 51, wherein the content, when accessed, further causes the machine to place the discarded next-in-line  $\mu$ OP of the first input stream into a replay loop.

55. An article of manufacture comprising:  
a machine accessible medium providing content that, when accessed by a machine, causes the machine to  
access a next-in-line  $\mu$ OP of an input stream;  
apply a metric to the next-in-line  $\mu$ OP; and  
if the next-in-line  $\mu$ OP satisfies the metric, identify the next-in-line  $\mu$ OP as critical.

56. The article of manufacture of claim 55, wherein the content, when accessed, further causes the machine to identify the next-in-line  $\mu$ OP as not critical if the next-in-line  $\mu$ OP does not satisfy the metric.

1           57.     The article of manufacture of claim 55, wherein the content, when  
2     accessed, further causes the machine, when applying the metric, to compare an age of the  
3     next-in-line  $\mu$ OP with a predefined threshold age.

1           58.     The article of manufacture of claim 55, wherein the content, when  
2     accessed, further causes the machine, when applying the metric, to determine whether a  
3     thread associated with the next-in-line  $\mu$ OP has been given priority.

1           59.     The article of manufacture of claim 56, wherein the content, when  
2     accessed, further causes the machine to issue a select signal, the select signal to indicate:  
3     if the next-in-line  $\mu$ OP is critical, that the next-in-line  $\mu$ OP is selected for output; and  
4     if the next-in-line  $\mu$ OP is not critical, that a next-in-line  $\mu$ OP of another input stream is  
5     selected for output.